

26. The device of claim 25, wherein said terminal means includes at least one of a displaying means, an external control means, a printing means, a compact disk means, a floppy disk means and an external interface means, which are connected to each other by said multiplexed bus.

27. The device of claim 25, wherein said multiplexed bus connects said microprocessor subsystem to a pulse forming means of an analog-digital subsystem.

28. The device of claim 25, wherein said multiplexed bus is divided on a data bus and an address bus, and a digital data exchange is provided by said data bus and said address bus.

29. A device for counting and measuring particles, comprising a remote light beam source connected by a fiber optic connecting means to a light detecting system, which is electrically connected to an analog-digital subsystem of a processing system, including a control subsystem, comprising a terminal means and a microprocessor subsystem electrically connected to each other and to said analog-digital subsystem by a multiplexed bus.

30. The device of claim 29, wherein said terminal means includes at least one of a displaying means, an external control means, a printing means, a compact disk means, a floppy disk means and an external interface means electrically connected to each other by said multiplexed bus.

31. The device of claim 29, wherein said multiplexed bus is divided on a data bus and an address bus, and a digital data exchange is provided by said data bus and said address bus.

Remarks

Claims 1, 4-17 are pending in this application, all of which have been substituted new Claims 18-31. Claims 2 and 3 have been canceled in their entirety as being anticipated. No new matters have been added. Applicant respectfully requests the Examiner's approval to cancel Claims 4, 5 as the dependent claims and substitute new independent Claim 20 with two new dependent Claims 21, 22, considering the substantial significance of the novelty and unobviousness of the improved timing (digital) processing method described in the original application (this substitution does not add the new matters and does not change any ideology, subjects and conceptions, described in the original application, and is absolutely in compliance with original drawings Figs. 1-12 and particularly with original drawings Figs. 8, 10-12 /new corrected drawing Fig. 8 and new renumbered drawings Figs. 9-11). If Examiner's approval of this substitution, the check # 1297 from 10/24/98 for amount of \$41.00 is attached.

According to item 1 of the DETAILED ACTION (page 2 of the OFFICE ACTION SUMMARY) and to Examiner Communication dated 10/09/98: The drawings filed 06/27/97 are objected to as indicated on the attached PTO-948, and The drawing correction is not complied with M.P.E.P. 608.02.

New drawing sheets Figs.1-11 are corrected , as requested by Examiner, according to:

Cancel original drawing Fig.9, considering the canceled claims 2, 3.

Original drawings Figs.10-12 are renumbered to substituted drawings Figs.9-11 respectively.

Original drawings Figs.1-8 and the renumbered drawings Figs.9-11 have been corrected as requested by the Examiner in compliance with 5. SIZE OF PAPER. 37 CFR 1.84(f); 6. MARGINS. 37CFR 1.84(g); 10. CHARACTERS OF LINES, NUMBERS, & LETTERS. 37 CFR 1.84(l) and 12. NUMBERS, LETTERS, & REFERENCE CHARACTERS. 37 CFR 1.84(p).

The Abstract and Specification have been corrected regarding the printed errors, improper language and grammatical incorrectness. Also the BACKGROUND OF INVENTION in the Specification has been amended considering the referred by Examiner patents.

According to items 2, 3 of the DETAILED ACTION (page 2 of the OFFICE ACTION SUMMARY): The information disclosure statement filed 06/27/97 fails to comply with 37 CFR 1.98(a)(2).

Applicant apologize for missing copies of each of reference, cited in application, in order to consider the references. All copies are applied to the present amendment on the separate papers.

According items 4-6 of the DETAILED ACTION (page 3 of the OFFICE ACTION SUMMARY):
Item 4 of OFFICE ACTION: Claim 17 is rejected under 35 U.S. C.112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Item 5 of OFFICE ACTION: Claim 17 recites the limitation "said remote light beam" in line 1. There is insufficient antecedence basis for this limitation in the claim.

Item 6 of OFFICE ACTION: Claims 17 recites the limitation "said fiber optics means" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Accordingly, Claim 17 has been canceled as a separate dependent claim and has been inserted into the substituted Claim 29 to correct the noted instance of indefiniteness and insufficiency, and thus the 35 U.S. C.112 (second paragraph) rejection of Claim 17, as substituted by Claim 29, should be withdrawn.

According item 7 of the DETAILED ACTION (page 3 of the OFFICE ACTION SUMMARY):
The following is quotation of the appropriate paragraphs of 35 U.S. C.102 that form the basis for the rejection under this section made in this Office Action: ...

Applicant thanks Examiner for the fragment of 35 U.S. C.102 presented in the Office Action.

According item 8 of the DETAILED ACTION (pages 3, 4 of the OFFICE ACTION SUMMARY):
Claims 1-15 are rejected under 35 U.S. C.102(e) as being anticipated by Staff et al. (5,619, 333).

Original Claims 1-15 stand rejected under 35 U.S. C. 102(e) as anticipated by Staff et al.

Applicant respectfully traverse this rejection.

Applicant agrees with Examiner regarding original Claims 2, 3. The original Claims 2, 3 are canceled in their entirety under 35 U.S. C.102 (e).

Regarding original Claims 1, 4-15, Applicant respectfully traverse this rejection.

Staff et al. disclose the portable on-line fluid contamination monitor, which comprises a window assembly 42 with a pair of transparent perspex windows 421, 422 and a lens assembly 44, and wherein a light from the bulb 451 is focused, having passed through the window assembly 42, by the lens (optical means) assembly 44 ... (see column 4).

Staff et al. use the focusing of the light from the bulb; the lenses for mentioned above focusing; and the windows, all of which are missing in the Applicant's improved device with non-imaging particle detection improved method. Additionally, the use (in the referred patent) of the windows (slits) for the light passage can lead to the diffraction effects, which can create a light noise, thereby creating a possible incorrectness of the final information regarding contaminations.

In contrast, in the improved invention, as apparent from the original Claims 1, 6 and substituted Claims 18, 23 and from Figs.6, 7 "... a light beam along a light beam axis intersects said particles along a particle flow axis in an area of a light detection means, which is placed on said light beam axis ..." Thus, the obstruction of the light beam by flowing particles is occurred in the light detection means area, eliminating possible light background and light noise, and also an improved device does not use any light passage windows and lens for the light focusing.

Staff et al. also disclose a simplified circuit diagrams of the electronic components on Figs.6-8. These schematics comprises the comparators 484 and the voltage comparators 504, 506, 512, which are intended for the analog signal processing.

Staff et al. use the analog signal processing by analog comparison method. The analog comparators are missing in the Applicant's improved method and device, which provide the timing (digital) signal processing

In contrast, in the improved invention, as apparent from the original Claims 4, 5 and substituted Claims 20-22, from description and from the original Figs.8, 10, 11 and substituted Figs.8-10 "... are disclosed the steps of: amplifying...; conversing...; forming the strobe pulse packages by strobing of ...; counting...; selecting...; counting... .

Accordingly, original Claims 2, 3 have ben canceled in their entirety, Claims 1, 4-15 have been canceled and substituted by Claims 18-31 to recite this distinction. Thus the 35 U.S. C.102(e) rejection of Claims 1-15, as substituted by Claims 18-31, should be withdrawn.

According items 9-11 of the DETAILED ACTION (page 4 of the OFFICE ACTION SUMMARY): Item 9 of OFFICE ACTION: Claims 6, 16, 17 are rejected under 35 U.S. C.102(e) as being fully anticipated by Chandler et al. (5,731,875) or Schmitz et al. (5,610,712).

Original Claims 6,16,17 stand rejected under 35 U.S. C. 102(e) as anticipated by Chandler et al. or Schmitz et al.

Applicant respectfully traverse this rejection.

Chandler et al. disclose a particle sensor with a plurality of fiber optic conductors, comprising a plurality of the light emitting lasers with a plurality of fiber optic stands 27a, and wherein the light from each fiber optic stand 27a emanated to a focusing optic system such as a lens 31. Also each fiber optic stand 27a directs a light from each of the plurality of laser

diodes 15, which are mounted "in line".

Chandler et al. use a plurality of light emitters ("two or more" - see column 6); a plurality of fiber optic conductors; and a focusing optic system, all of which are missing in the Applicant's improved methods and devices, which disclose a sensor with the single laser beam source and single fiber optic connecting means. In the referred patent, the use of a plurality of light sources is intended for the power division in order to eliminate a heat-sink. The high power is needed to produce a scattered light, as it is represented, for example, on Fig.4 of the referred patent. The scattered light principles are not used in the Applicant's improved method and device, which provide a particle direct detection with no imaging means (e.g. with no lenses, mirrors, etc.). Also Chandler et al. declare, that "The lens 31 focuses the light rays 29 to form a light beam 45 which has extremely small diameter and is very intense." (see column 5, lines 42, 43), but the lens 31 will not focus the plurality of the laser rays 29 (from the laser diodes 15) to extremely small diameter and very intense beam 45. As applicant, having foreign and U.S. Ph.D. degree in Electronics and Automatic Control Processes and M.S. degree in Engineering, best knowledge, after focusing (by lens 31) of the plurality of laser rays 29 will be formed the same plurality of laser rays 29, but very closed to each other rays (each ray in such "bundle" of the rays can possibly be visually distinguished). This effect is in compliance with the quantum- and optic fundamental laws for the coherent monochromatic light. That is the reason why scientists try to create a super-laser (high-power/intense laser), because it is probably still impossible to unite a plurality of laser rays into the one intense beam. In this case, each flowing through the focal point 33 particle may intersect two or more laser low power rays 29 (depends on the locus /placement/ of the terminus 25) and, of course, may be counted and measured twice or more times, creating an incorrectness of the resulting information about quantity of the particles. Also such sensor will provide less sensitivity, considering that each of the emitting lasers has insufficient (decreased) power for detection, for example, 0.1 μ m or below 0.1 μ m particles by light scattered principles.

Additionally, as Applicant's best knowledge, the priority of Applicant's application is filed on June 02, 1997 by Provisional Patent Application Serial No. 60/048,277 and the referred patent (Chandler et al.) is filed on June 26, 1997.

In contrast, in the improved invention, as apparent from the original Claims 6, 16, 17 and substituted Claims 23, 29-31, and from the original Figs.6, 7, 12 and substituted Figs.6, 7, 11 "... a light beam along a light beam axis intersects a particle flow axis in an area of a light detection means, which is placed on said light beam axis ..." and an improved device comprises a (single) remote light beam source connected by a (single) fiber optic connecting means to a light detecting system, and also the improved method and device eliminate any optic means (for example, lens), intended for focusing.

Schmitz et al. disclose a fiber optic filter assembly for laser diffraction particle sizing method, comprising the six meter length of the optical fiber cable 36 is wrapped in a coil around the cylindrical tube 44 and two stepper motors 82, intended for dynamical alignment the light beam 56 and also, as shown on Figs.2 and 3, a collimating or beam forming lenses 64 and 66 for light emanating focusing, a cladding layer surrounding a central arc, a Fourier lens 92, etc.

Schmitz et al. use the lenses, an optical fiber cable wrapped in a coil around the cylindrical tube and the motors for dynamical alignment of the light beam, lenses, etc., which are missing in the improved device, including the less adjustable and less expensive means.

In contrast, in the improved invention, as apparent from the original Claims 6, 16, 17 and substituted Claims 23, 29-31, and from the original Figs. 6, 7, 12 and substituted Figs. 6, 7, 11 "... a light beam along a light beam axis intersects a particle flow axis in an area of a light detection means, which is placed on said light beam axis ..." and an improved device comprises a remote light beam source connected by a fiber optic connecting means to a light detecting system, which is electrically connected to an analog-digital subsystem of a processing system, including a control subsystem, comprising a terminal means and a microprocessor subsystem electrically connected to each other and to said analog-digital subsystem by a multiplexed bus. The improved device also does not include any lenses, an optical fiber cable wrapped in a coil around the cylindrical tube and the motors for dynamical alignment of the light beam, etc., that makes an improved device less adjustable and less expensive.

Accordingly, original Claims 6, 16, 17 have been canceled and substituted by Claims 23, 29-31 to recite this distinction. Thus the 35 U.S. C. 102(e) rejection of original Claims 6, 16, 17, as substituted by Claims 23, 29-31, should be withdrawn.

Item 10 of OFFICE ACTION: Claim 6, 16, 17 are rejected under 35 U.S. C. 102(b) as being fully anticipated by Tatsuno et al. (4,595,291).

Original Claims 6, 16, 17 stand rejected under 35 U.S. C. 102(b) as anticipated by Tatsuno.

Applicant respectfully traverse this rejection.

Tatsuno discloses a particle diameter measuring device, comprising a plurality of optic fibers 34, a plurality of photo-detectors 40, and the collimator lens 62, and wherein are used a scattering light angle detecting principles.

Tatsuno uses a plurality of optical fibers to conduct a scattered light, as a produced light (secondary light), to the photo-detectors, that is missing in the Applicant's improved device.

In contrast, in the improved invention, as apparent from the original Claims 6, 16, 17 and substituted Claims 23, 29-31, and from the original Fig. 12 and substituted Fig. 11 an improved device comprises a fiber optic connecting means, intended to conduct a light beam (as a primary light) from the remote light beam source to the light detecting system. Additionally, Tatsuno has claimed (claims 7, 8) and declared (see column 6) the scattered light intensity measurement in the angle range from 0° to 60° . Such angle range may be insufficient, in order to detect all plurality of scattered light (for example, the light, scattered in the angle of the rest 300°). The Applicant's improved method and device are free of this deficiency.

Accordingly, original Claims 6, 16, 17 have been canceled and substituted by Claims 23, 29-31 to recite this distinction. Thus the 35 U.S. C. 102(b) rejection of original Claims 6, 16, 17, as substituted by Claims 23, 29-31, should be withdrawn.

Item 11 of OFFICE ACTION: The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Nakamoto et al. (5,325,169) discloses an apparatus for analyzing cells in urine.

Applicant respectfully traverse this rejection.

Nakamoto et al. disclose the apparatus and method for analyzing cells, comprises a collector lens 7, a dichroic mirror 9, a light shield 8, having a pin hole 16, etc. and wherein are used the scattered light collection principles.

Nakamoto et al. use also a condensed light passes through a pin hole of the light shield, that can lead to the diffraction effects, which can create a light noise in the cell analyzing apparatus, thereby creating an incorrectness of the final information regarding cells.

In contrast, in the improved invention, as apparent from the original Claims 1-17 and substituted Claims 18-31, and from the original Figs. 1-12 and substituted Figs. 1-11 an improved device comprises a direct detection system, not having an optic means (e.g. lens, mirrors) and any light shields.

In view of the foregoing amendments, substitutions and accompanying remarks, rejections of original Claims 1-17 as substituted by new Claims 18-31, should be withdrawn.

Applicant thanks Examiner for very helpful advice regarding Patent Attorney and this amendment has been prepared with Patent Attorney assistance, however, the applicant, as pro-se applicant, respectfully request under M.P.E.P. 707.07(j), that if the Examiner feels that Applicant's present Claims are not entirely suitable, the Examiner drafts one or more allowable Claims for Applicant.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicant, at the telephone number indicated below, to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, Applicant respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees, which may be due with respect to this paper, will be paid by Applicant.

For all the reasons given above, applicant respectfully submits that the errors in the specification are corrected and the claims comply with Sections 102, 112. Accordingly, applicant submits that this application is now in full condition for allowance, which action applicant respectfully solicits.

Very respectfully,



ALEKSANDR L. YUFA

November 03, 1998

Address: 698 CYPRESS AVE.,
COLTON, CA. 92324-1952,
Phone/Fax: (909) 370-4454

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I certify that this correspondence will be deposited with the United States Postal Service as Certified First Class Mail proper postage affixed in an envelope addressed to: "Assistant Commissioner for Patents, Washington, DC: 20231" on the date below.

Date: November 03, 1998 Applicant: ALEKSANDR L. YUFA

